Volunteer Lake Assessment Program Individual Lake Reports

ISLAND POND, DERRY, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	10,880	**Max. Depth (m):**	24.3	**Flushing Rate (yr^{-1}):**	1.8
Surface Area (Ac.):	498	**Mean Depth (m):**	5.4	**P Retention Coef:**	0.55
Shore Length (m):	14,600	**Volume (m^3):**	11,558,000	**Elevation (ft):**	205

TROPHIC CLASSIFICATION

Year	Trophic class
1985	MESOTROPHIC
2002	EUTROPHIC

KNOWN EXOTIC SPECIES

Fanwort
Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

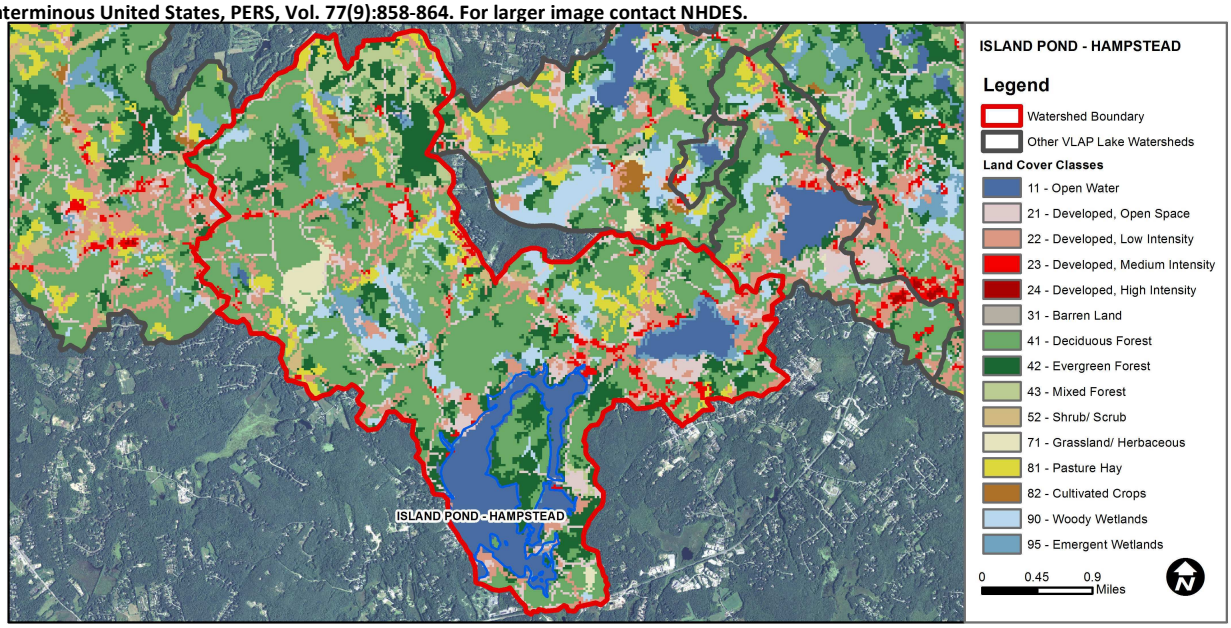
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Good	There are at least 10 samples with one, but < 10% of samples, exceeding criteria.
	Dissolved oxygen satura	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

ISLAND POND - SANBORN SHORE ACRES	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
ISLAND POND - CHASE'S GROVE	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	10.8	Barren Land	0	Grassland/Herbaceous	1.33
Developed-Open Space	7.27	Deciduous Forest	38.67	Pasture Hay	3.98
Developed-Low Intensity	10.4	Evergreen Forest	12.87	Cultivated Crops	0.25
Developed-Medium Intensity	2.02	Mixed Forest	3.73	Woody Wetlands	4.52
Developed-High Intensity	0	Shrub-Scrub	1	Emergent Wetlands	3.08

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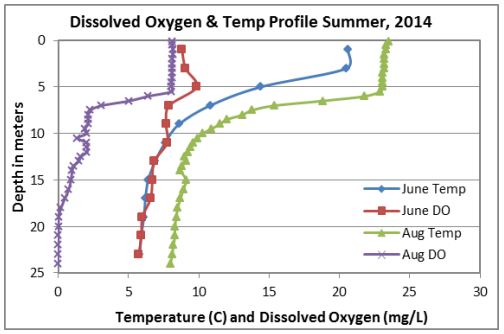
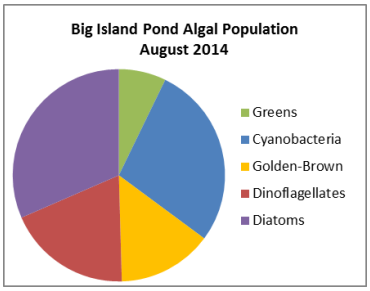
Big Island Pond, Derry

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels decreased slightly as the summer progressed, decreased from 2013, and were slightly less than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity levels continue to be elevated and much greater than the state median. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began.
- **E. coli:** E. coli levels at Campground Inlet and Taylor Brook were elevated in July following 0.5 inches of rainfall prior to sampling. This could indicate potential sources such as wildlife, domestic or agricultural animal waste.
- **Total Phosphorus:** Epilimnetic phosphorus levels were elevated in July likely due to sediment in the sample as noted on the sample receipt checklist. Metalimnetic (middle water layer) and hypolimnetic (lower water layer) phosphorus levels increased slightly from June to August but remained at low levels. Historical trend analysis indicates stable epilimnetic phosphorus with high variability between years. Campground Inlet and Taylor Brook phosphorus levels were within the average range for those stations. Drew Inlet phosphorus levels have increased slightly since monitoring began.
- **Transparency:** Transparency measured without the viewscope (NVS) was low in June likely due to wind and wave action at the deep spot. July and August transparency was good and the 2014 average was much better than 2013, however historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Transparency measured with the viewscope (VS) was consistently better and likely a more accurate representation of conditions.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in June likely due to wind and wave action, and in July due to sediment in the sample as noted on the sample receipt checklist. Hypolimnetic turbidity increased slightly as the summer progressed. Campground and Drew Inlets experienced slightly elevated turbidity in July following a rain event.
- **pH:** Epilimnetic and tributary pH levels were sufficient to support aquatic life. Hypolimnetic pH levels tend to be less than the desirable range 6.5-8.0 units.
- **Dissolved Oxygen/Temp:** Dissolved oxygen levels were good in June, however by August oxygen levels were at zero in the hypolimnion. This indicates a significant layer of sediment and organic material at the lake bottom that has the potential to release phosphorus into hypolimnetic waters under anoxic conditions.
- **Recommended Actions:** The elevated chloride and worsening epilimnetic conductivity trend indicates the need to address winter road salt and de-icing practices in the watershed. Encourage local road agents and winter maintenance companies to obtain a NH Voluntary Salt Applicator license through the UNH Technology Transfer Center's Green SnowPro Certification program. Educate watershed residents to "Scoop the Poop" and pick up and properly dispose of domestic animal waste so it doesn't get washed into rivers and streams during storm events leading to elevated bacteria levels. Keep up the great work!





NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Table 1. 2014 Average Water Quality Data for BIG ISLAND POND

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	14.2	4.29	40	184.2		12	4.08	4.88	1.41	7.20
Metalimnion				174.6		10			0.96	6.64
Hypolimnion				172.2		10			2.82	6.48
Campground Inlet			48	225.3	213	17			1.60	7.07
Drew Inlet			44	201.2	53	20			1.35	6.80
Gill					10					
Taylor Brook			42	201.1	205	12			1.19	6.85
Taylor Brook At Rd				198.2	50	15			1.66	6.81
Taylor Brook Upstream					130					

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant, data show low variability.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant, data highly variable.